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PLATTSBURGH AIR FORCE BASE SUPERFUND SITE
PLATTSBURGH, CLINTON COUNTY, NEW YORK

INTERIM REMEDIAL ACTION REPORT

FIRE TRAINING AREA (FT-002) / INDUSTRIAL AREA GROUNDWATER OU (OPERABLE UNIT 6)

September 2006

I. INTRODUCTION

This document presents the Interim Remedial Action Report (RAR) for the interim remedy that addresses the groundwater operable unit at the Fire Training Area (FT-002) / Industrial Area at Plattsburgh Air Force Base (PAFB), in Plattsburgh, New York. This component of the FT-002 remedy is also referred to as Operable Unit 6 or OU 6.

This report is consistent with the requirements of the (EPA) guidance documents entitled, "Remedial Action Report Documentation for Operable Unit Completion (June 1992)," and "Closeout Procedures for National Priorities List Sites (OSWER Directive 9320.2-09A-P, PB98-963223, January 2000)." This RAR was developed by EPA, based in part on information provided by the Air Force.

Site Description

Plattsburgh AFB, located in Clinton County in northeastern New York State, is bordered on the north by the City of Plattsburgh, the south by the Salmon River, on the west by Interstate 87, and on the east by Lake Champlain. The base is approximately 26 miles south of the Canadian border and 167 miles north of Albany. Lands to the east, west, and south of the base are predominantly rural and residential. Approximately 2,000 people obtain drinking water from private wells located within 3 miles of the base.

Site FT-002, located near the central western boundary of the facility, consisted of four fire training pits, each 50 to 100 feet in diameter, centered within an approximately 8 acre area. Several landfills and a small arms range utilized by the base lie in close proximity to the site. The FT-002 / Industrial Area (FT-002 / IA) Groundwater OU includes groundwater at the FT-002 site, as well as groundwater at 6 other IRP sites located in the industrial area of the base (Sites SS-004, SS-005, SS-006, SS-011, SS-017, and SD-041), as groundwater contamination from the FT-002 site has migrated to these sites and either commingled with existing groundwater contamination at the sites or contaminated the groundwater underlying the sites. Source contamination (soil and free product) at the FT-002 site is being addressed as part of a separate OU, the FT-002 Source OU. The areas encompassed by both the FT-002 Source OU and FT-002 / IA Groundwater OU have been designated for future industrial use in the base reuse plan.

Site History

PAFB served as a tactical (bombardment and air refueling) wing in the Air Force Strategic Air Command (SAC) from 1955 to 1991. In 1991, the bombardment wing was removed and in 1992 operations were realigned to form the 380th Air Refueling Wing under the Air Mobility Command (AMC). PAFB was slated for closure in 1993 under the Defense Base Closure and Realignment Act (BRAC), and the base was closed on September 30, 1995. Reuse of PAFB is being administered by the Air Force Real Property Agency (AFRPA) in conjunction with the Plattsburgh Airbase Redevelopment Corporation (PARC) and the Clinton County Industrial Development Agency (CCIDA).

Under the National Contingency Plan and Executive Order 12580, the Air Force has been a delegated lead agency responsible for CERCLA actions on its facilities. The Air Force has conducted environmental investigations at PAFB since the early 1980s. The Installation Restoration Program (IRP) at PAFB, which involves investigation and cleanup under CERCLA, currently includes a total of forty-one sites at various stages of investigation and/or cleanup. The IRP is being implemented according to a Federal Facilities Agreement (Docket No.: II-CERCLA-FFA-10201) signed between the Air Force, EPA, and the New York State Department of Environmental Conservation (NYSDEC) on July 10, 1991. Joint selection of remedies by federal agencies and EPA at Federal Superfund sites is required by CERCLA Section 120. The State of New York provides written concurrence on the remedies selected by the Air Force and EPA in Records of Decision (RODs). PAFB was placed on the National Priorities List (NPL) on July 10, 1989.

The fire training pits at site FT-002 were utilized from 1959 until they were closed in1989. During training exercises, base firefighters saturated the pits with water, and then poured in off-specification jet fuel mixed with waste solvents, and ignited the mixture. Contamination addressed by the FT-002 / IA Groundwater OU was caused by the dissipation of unburned jet fuel and solvents found in free product form floating on groundwater, in soil in the vadose zone, and in residual product adhering to soil in the zone of water table fluctuation.

Compounds detected in the FT-002 / IA Groundwater at the highest levels include 1,2-dichloroethene, cis-1,2-dichloroethene, trichloroethene, toluene, ethylbenzene, total xylenes, m&p xylenes, 1,2-dichlorobenzene, and naphthalene.

II. OPERABLE UNIT BACKGROUND

The Interim ROD for the FT-002 / IA Groundwater OU was signed in June 2003. The FT-002 / IA Groundwater OU includes groundwater at the FT-002 site, as well as groundwater at 6 other IRP sites located in the industrial area of the base (Sites SS-004, SS-005, SS-006, SS-011, SS-017, and SD-041), as groundwater contamination from the FT-002 site has migrated to these sites and either commingled with existing groundwater contamination at the sites or contaminated the groundwater underlying the sites. The remedial objectives for the Groundwater OU are as follows:

1. **Prevent ingestion of groundwater containing contaminant concentrations above ARARs;**

2. **Restore groundwater to** ARARs;

3. Prevent migration of groundwater with contaminant concentrations above ARARs beyond base boundaries; and

4. Prevent further impact to surface water that has been impacted by contaminated groundwater.

The Remedy includes three collection trenches located between the runway and flightline, along the eastern edge of the flightline, and along Idaho Avenue, respectively; extraction wells located in the plume core west of the runway; a groundwater treatment system to treat contaminated groundwater from collection systems discharging to the WSA drainage system; institutional controls to limit the use and discharge of groundwater and to prohibit property development that would interfere with remedial operations; groundwater and surface water monitoring; and five-year reviews. The remedy involves one contingency that may be implemented during the design/implementation of the remedy. This is a consideration to treat groundwater from either or both of the collection systems discharging to the Golf Course drainage system. Source contamination (soil and free product) at the FT-002 site is being addressed under the FT-002 Source OU.

III. CONSTRUCTION ACTIVITIES

The Air Force was the lead agency for the design and construction of the remedy selected in the June 2003 FT-002 / IA Groundwater OU Interim ROD. Design and construction were performed on behalf of the Air Force through contracts with the Air Force Center For Environmental Excellence (AFCEE). URS Corp. prepared remedial design (RD) plans and specifications for all remedial components, which were approved by EPA and NYSDEC. The design work was completed in September 2003, and construction began in September 2003. Construction of the extraction wells, runway trench, groundwater treatment plant, and initial half of the east flightline collection trench was performed by ECC Inc. The remainder of the east flightline trench and Idaho Ave trench construction was performed by Shaw E and I Inc. The remedial system's construction and performance standards, including health and safety standards, were established in the RD plans and specifications. These standards addressed: groundwater extraction, well depths; screen locations and pumping rates; treatment system hydraulic requirements; air stripper performance criteria, and system performance monitoring that addressed air, liquid and hydraulic performance criteria, and collection trench specifications.

Each of the construction standards were monitored carefully during construction by URS Corp, with Air Force oversight to ensure compliance with all requirements. Operational performance standards, which were also established in the final RD, were monitored during performance testing, which took place for approximately seven months, after nearly all the remedial systems were constructed and found to be in compliance with the requirements of the final RD.

The scope of the construction activities included the following:

- drilling and installation of five new groundwater extraction wells designed to extract groundwater at a rate of 80 gallons per minute (gpm) from the westernmost portion of the FT-002 plume and transport the water via gravity main to a pump station and subsequently to the water treatment system;
- construction of a 4,000 foot long groundwater collection trench located between the airport runway and flightline (runway / flightline collection trench) to collect groundwater flowing within the upper water-bearing zone towards a surface water discharge area located between the flightline and runway, and transport the water via gravity main to a pump station and

subsequently to the water treatment system. The trench was to consist of slotted high density polyethylene (HDPE) pipe, geotextile filter fabric, and permeable collection stone installed below the groundwater table surface;
- construction of a 500 gpm water treatment system to reduce contaminant concentrations in groundwater extracted from the 5 extraction wells and runway trench to levels below the discharge limitations for the system. The system was to include an aerator, 5-stage air stripper, clarifier, and 5 sand filters. The stripper was designed to be a closed-loop air circulation system using 2 carbon adsorption vessels to remove VOCs from a process air stream;
- construction of a 4,600 foot long groundwater collection trench located east of the flightline (east flightline collection trench) to collect groundwater flowing eastward within the upper water-bearing zone towards the industrial area, and transport the water via gravity flow to the surface water of the base golf course drainage system. The trench was to consist of slotted HDPE pipe, geotextile filter fabric, and permeable collection stone installed below the groundwater table surface;
- construction of a groundwater collection trench located along Idaho Avenue (Idaho Ave collection trench) consisting of 2 sections, 1,400 ft and 475 ft, respectively, to collect groundwater flowing eastward within the upper water-bearing zone, and transport the water via discharge pipe to the golf course drainage system. The trenches were to consist of slotted HDPE pipe, geotextile filter fabric, and permeable collection stone installed below the groundwater table surface.

Problems and significant encounters with hazardous conditions during the course of construction included:

- A new discharge pipe had to be constructed for the runway collection trench as the existing line did not function properly with the trench. Directional drilling procedures had to be utilized to install the new pipe;

- Problems were encountered with the treatment plant, as there was a significant amount of flow over the plants capacity initally. The overflow was a result of much higher than predicted flow from both the extraction wells and runway / flightline trench upon startup. Restrictor plates were utilized to take care of the overflow problem, which last several months;

- Problems were encountered with the pumping station that resulted in only one of the two pumps being able to be used at a time during the initial overflow problem. The pump station was rewired to address the problem;

- Artesian-like conditions were encountered during initial construction of all 3 trenches. To address the hydraulic problems of slurry trenching, platforms had to be built to develop hydraulic head;

- Quicksand and weather problems delayed completion of the north leg of the Idaho Ave trench for several months.

The remedial systems consist of the following:

- 5 groundwater extraction wells operating at up to 80gpm. Wells are outfitted with electric submersible pumps and depth and level pressure sensors; 1.5 inch diameter PVC force mains from each extraction well equipped with a manhole containing a magnetic flow meter and a buried ball valve; 8 inch diameter HDPE gravity main with cleanouts;
- 4,000 ft long collection trench (runway / flightline trench) consisting of 10 inch diameter slotted HDPE collection pipe, geotextile filter fabric, and collection stone; 1,548 ft discharge pipe (12 inch diameter solid wall HDPE); Nine 8 in diameter solid wall HDPE cleanouts; one 20 inch diameter solid wall HDPE cleanout inside a 48 inch concrete riser with manhole cover; two 4 ft diameter concrete junction manholes; buried gate valve located between manhole MH-A2 and the collection pump station;
- 500 gpm water treatment system with 20% safety factor. The system includes: a collection pump station equipped with 2 submersible pumps, redundant controls, and an overflow discharge line to the treated water discharge point (an unnamed stream at the former weapons storage area); hydraulic venturi aerator; 5 stage stripping system equipped with 5 recirculation pumps; contact clarifier with polymer batch system and discharge trough; clearwell filter feed pump; sand filtration system consisting of 4 parallel pressure filter vessels; off-gas treatment system that includes a duct heater, 2 phase carbon adsorption vessels (2,000 lbs carbon/vessel, 2,500 cubic ft per minute (cfm) air flow capacity per vessel), and a 2,500 actual cfm (acfm) booster fan; 40 ft discharge stack constructed of 18 in diameter by 3/8 in wall pipe; and programmable logic controller.
- 4,988 ft long collection trench (east flightline trench) consisting of 6 inch diameter slotted HDPE collection pipe, geotextile filter fabric, and collection stone; 6 inch diameter PVC solid wall HDPE discharge pipe with shut-off valve; and a 6 inch diameter flow measurement manifold inside the manhole; and
- Collection trench (Idaho Ave trench) consisting of 2 branches (1,396 ft and 475 ft, respectively) consisting of 6 inch diameter slotted HDPE collection pipe, geotextile filter fabric, and collection stone; four 6 in diameter solid wall HDPE cleanouts; 6 inch diameter solid wall HDPE discharge pipe with 2 shut-off valves located immediately prior to the concrete drainage structure; and a 6 in diameter PVC manifold and drainage pipe located inside the concrete drainage structure and culvert.

Construction of the remedial systems was completed in February 2005.

IV. CHRONOLOGY OF EVENTS

Date	Event
1984-1985	Preliminary Assessment (PA) conducted for site FT-002.
1987	Site Inspection of Site FT-002 conducted.

1988-1993	Remedial Investigation (RI) for FT-002 Soil (Source) OU conducted.
1990	Engineering Evaluation/Cost Analysis (EE/CA) evaluating alternatives for recovery of free floating (pumpable) product from FT-002.
1991-1992	RI for soil and groundwater contamination at Site SS-011.
1992-1993	Removal Action at FT-002 Source OU: Free product recovery system constructed and operation begun.
1989-1993	RI for FT-002 Groundwater OU (groundwater west of industrial area) conducted.
1994-1995	Feasibility Study (FS) conducted to determine long term remedy for the FT-002 Groundwater OU (groundwater west of industrial area).
1994-1995	RI for soil contamination at Site SS-004.
1995	FS conducted to determine long term remedy for FT-002 Source OU.
1993-1996	RI for soil and groundwater contamination Sites SS-005, SS-006, SS-017.
1993-1997	EE/CA FT-002 Groundwater Natural Attenuation (biodegradation).
1996-1998	Removal Action (2^{nd}) at FT-002 Source OU (1996 Action Memo). Addressing soil contamination through Soil Vapor Extraction (SVE) and Bioventing systems, and water table depression. Systems constructed and operation begun. Free product removal and groundwater treatment systems upgraded.
1995-2001	RI/FS addressing expanded FT-002 / Industrial Area Groundwater OU. Included groundwater at six sites in the industrial area.
1999-2001	Supplemental Evaluation to Basewide Environmental Baseline Survey (EBS) for groundwater at Site SD-041.
March 2001	ROD for cleanup of FT-002 Source OU signed calling for upgrade and expansion of the existing systems installed during previous Removal Actions.
2001	Supplemental Evaluation / FS for Site SS-017 Soil Contamination.
2001	RI for soil and sediment contamination at Site SD-041.

2001	Pump House No. 3 groundwater investigation.
June 2003	FT-002 / IA Groundwater OU Interim ROD signed.
September 2003	FT-002 / IA Groundwater OU Interim Remedial Design completed and approved by EPA and NYSDEC.
September 2003	Construction of FT-002 / IA Groundwater OU remedial systems begun.
January 2004	Initial operation of FT-002 Source OU remedial systems begun.
February 2005	Construction of FT-002 / IA Groundwater OU interim remedial systems completed and testing begun.
May 2005	Initial operation of FT-002 /IA Groundwater OU interim remedial systems begun and testing continued.
October 20, 2005	Final inspection completed and system approved for FT-002 IA Groundwater OU (OU 6) interim remedy.

The following is a chronology of remedial construction activities for the FT-002 / IA Groundwater OU extraction wells, collection trenches, and groundwater treatment facilities, which are currently being used to cleanup the OU 6 contaminated groundwater:

- September 2003: System design completed by URS Inc., and approved by EPA and NYSDEC. Contract awarded to URS Inc.
- February 2005: Construction completed.
- February 2005 through September 2005: Operational testing conducted.
- May 2005: Continuous system operation commenced.
- October 2005: Final inspection completed and system approved.

V. PERFORMANCE STANDARDS AND CONSTRUCTION QUALITY CONTROL

The RD plans and specifications for the RA were carefully reviewed by EPA and NYSDEC for compliance with all requirements of the Interim ROD, and all applicable Quality Assurance and Quality Control (QA/QC) procedures and protocols. Groundwater collection trenches and groundwater extraction wells and the treatment system were monitored during startup. Air and water quality data were collected to evaluate the effectiveness of the groundwater treatment system to ensure that the quality of the influent was similar to that which was anticipated, and to monitor the effects of pumping groundwater. The water levels in various wells were also measured daily to monitor the decline in water levels imposed by the pumping. Sampling was also performed in the groundwater collection trenches, groundwater extraction wells, treatment

system influent and effluent, and monitoring wells. Samples of groundwater treatment system influent and effluent were tested for VOCs as well as for general chemistry parameters including manganese, iron, TDS, TSS, TOC, pH and alkalinity. The results indicate that effluent quality meets discharge requirements.

The QA/QC program utilized through the RA was sufficiently rigorous and was adequately complied with to enable EPA and NYSDEC to determine that the analytical results reported were accurate to the degree needed to assure satisfactory execution of the RA, consistent with the Interim ROD, and the RD plans and specifications.

VI. FINAL INSPECTION AND CERTIFICATION THAT REMEDY IS OPERATIONAL AND FUNCTIONAL

During remedial action activities, field observations were conducted by EPA and NYSDEC. An inspection of the groundwater extraction wells, collection trenches, and groundwater treatment system, OU 6, was conducted by EPA and NYSDEC on October 20, 2005.

Based on the field observations associated with the inspection conducted by EPA and NYSDEC, it has been determined that construction of the FT-002 / IA Groundwater OU groundwater extraction wells, collection trenches, and groundwater treatment system, OU 6, has been completed and that the remedial activities conform with the remedy selected in the June 2003 Interim ROD.

VII. OPERATION & MAINTENANCE

Air and groundwater monitoring and collection trench and treatment system influent and effluent monitoring are ongoing activities at the Site. This sampling provides information to evaluate the operation of the system.

Requirements for routine and periodic monitoring of the collection trenches and extraction wells are as follows:

- flow measurements daily for runway/flightline trench and extraction wells and weekly at the east flightline and Idaho Ave trenches;
- visual inspection (for sinkholes) of trench discharge outlets (weekly); visual inspection of ground surface near trenches and water elevation monitoring of trench cleanouts (monthly);
- water elevation monitoring of vicinity well/piezometers (quarterly);
- video inspection and cleaning of collection and discharge pipes (annually for runway / flightline trench, currently being re-evaluated); and
- water elevation monitoring of collection and discharge pipe cleanouts (monthly), and of collection pipe cleanouts, extraction wells, and surrounding wells and piezometers (quarterly).

- east flightline trench: sampling and analysis as follows: EFEFF-1 (trench discharge point): VOCs every 2 weeks; Pond Outfall (surface water location at the aeration pond outfall): VOCs every 2 weeks. Discharge criteria request to NYSDEC to reduce frequency to monthly is pending;
- Idaho Ave trench: sampling and analysis is as follows: IAN&S (combined discharge from the north and south trench segments joined by a manifold inside the concrete drainage structure): VOCs and ammonia every 2 weeks. Discharge criteria request to NYSDEC to reduce frequency to monthly is pending;
- Golf Course Drainage System: sampling and analysis is as follows: SW-MNA-3A (surface water location on golf course drainage system): VOCs and ammonia every 6 weeks; SW-MNA-1 (surface water location at base boundary): VOCs and ammonia every 6 weeks. Discharge criteria request to NYSDEC to reduce frequency to quarterly is pending;

Requirements for routine and periodic monitoring of the collection pump station are as follows:
- monitor water level and pump speeds (daily);
- conduct visual inspection and check sediment level (every 2 weeks);
- remove any debris and sediment buildup inside the pump station (as needed every 6 to 12 months);

Requirements for routine and periodic monitoring of the water treatment system are as follows:
- influent flow rate (daily); effluent water samples (weekly); influent samples (quarterly);
- All samples are analyzed for select VOCs, phenolic compounds, select metals, ammonia (N), nitrate (N), CBOD, TKN, total recoverable phenolics, TSS, and TDS. Discharge criteria request to NYSDEC to reduce frequency is pending.

These data will aid in assessing treatment system performance over time.

VIII. SUMMARY OF PROJECT COSTS

The original capital cost estimate to implement the remedial action described in the ROD (groundwater extraction wells, three collection trenches, groundwater treatment system) was $9.5 million. The actual capital cost was $ 16,010,000. The operational and maintenance (O&M) cost estimate in the ROD for the first year was $370,000. The annual O&M cost for the first year is now expected to be approximately $ 477,000, based on 2005 contract data.

IX. OBSERVATIONS AND LESSONS LEARNED

- The hydraulics of slurry trench construction can be overcome through the use of platforms to develop hydraulic head.

- Trench boxes can be used instead of slurry trenching to overcome quicksand conditions during trench construction.

- Existing drains should be checked ahead of time before being slated for use.

- Initial groundwater flow from wells and collection trenches prior to groundwater reaching equilibrium can be greatly underestimated when predicted through the use of groundwater modeling.

- During start-up of the groundwater treatment plant, there were numerous lightning strikes in the area of the five extraction wells. These strikes caused damage to telemetry and processing equipment. Surge and lightning protection devices needed to be installed.

X. OPERABLE UNIT CONTACT INFORMATION

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: SEP 29 2006

SUBJECT: Approval of the Interim Remedial Action Report for Operable Unit 6 at Plattsburgh Air Force Base, Plattsburgh, Clinton County, New York

FROM: John S. Malleck, Chief
Federal Facilities Section

TO: Robert Vaughn, Chief
Special Projects Branch

Attached for your approval is the Interim Remedial Action Report, documenting the completion of remedial action construction at Operable Unit 6 at the Plattsburgh Air Force Base Superfund Site, Plattsburgh, Clinton County, New York.

Please denote your approval of the subject document by signing below.

Attachment

Approved: RF Vaughn 9/28/06
Robert Vaughn, Chief — Date
Special Projects Branch